REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim 5 has been cancelled.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Applicant respectfully submits that the disclosure of Applicant's application provides support for the amendments to the claims. For example, at least page 5, lines 21-24, and page 6, lines 13-15, of Applicant's specification and original claim 5 provide support for the amendments to claim 1.

After amending the claims as set forth above, claims 1, 2, 4, 6-17, and 20 are now pending in this application.

Rejection under 35 U.S.C. § 103

Claims 1-17 and 19-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,554,225 to Sounai *et al.* (hereafter "Sounai") in view of U.S. Patent No. 6,562,507 to Cisar *et al.* (hereafter "Cisar"). This rejection is respectfully traversed.

Sounai discloses a molten carbonate fuel cell with a cathode 14, an anode 15, and an electrolyte layer 13. See Sounai at col. 4, lines 19-30. Each of the cathode 14 and anode 15 include a first porous layer 18 formed at a side of the electrolyte layer 13 and a second porous layer 19 formed at the opposite side. See Sounai at col. 4, lines 36-42, and Figure 2. Sounai discloses that the first porous layer 18 and the second porous layer 19 have a porosity of 60-80%. See Sounai at col. 4, lines 42-52.

Sounai discloses that the pore size of the first porous layer 18 is set to allow capillary action and that the pore size of the second porous layer 19 is set to not allow the capillary

action, with the first porous layer 18 having a small pore size and the second porous layer 19 having a large pore size. See Sounai at col. 5, lines 25-29, 41-46, and Figure 2. Sounai discloses that the first porous layer 18 has a pore size of 0.3 to 20μm, while the second porous layer 19 has a pore size of 21 to 50 μm. See Sounai at col. 4, lines 44-52. Thus, the order of the first and second layers 18, 19 of Sounai is opposite to the order of the stack recited in claim 1, as shown in the example of the enclosed Exhibit B, in which the layer with the greatest porosity is sintered to a side of an impermeable metal structure, as recited in claim 1.

The Office argues on page 3 of the Office Action that it would have been obvious to provide the first and second porous layers 18, 19 of Sounai with porosities of greater than 80% and less than 80%, as recited in claim 1, because Sounai discloses a porosity of 60 to 80% for each layer and a *prima face* case of obviousness exists when claimed ranges are close enough that one skilled in the art would have expected the ranges to produce the same properties, arguing that 80% is close enough to greater than 80% and citing *Titanium Metals Corp.* The Office further argues on page 5 of the Office Action that Sounai discloses that second porous layer can have a diameter of 25 μm, citing Example 1 of Sounai in col. 6, lines 5-22.

However, Sounai does not disclose or suggest a stack comprising, among other things, an impermeable metal structure, at least one first metal fiber layer, and at least one second metal fiber layer, said first metal fiber layer having fibers with an equivalent diameter larger than 20 μm, said second metal fiber layer having fibers with an equivalent diameter smaller than 10 μm, wherein a porosity of said second metal fiber layer is less than 80%, and wherein a porosity of said first metal fiber layer is more than 80%, as recited in claim 1. Execept for Example 1, Sounai is silent in regard to the porosities and the equivalent diameters of the fibers of the porous metal layers 18, 19.

In Example 1, Sounai discloses that a first porous layer includes fibrous material with a diameter of 4 μm, a pore size of 2 to 5 μm, and a porosity of 75%. Sounai discloses that the second porous layer of Example 1 includes fibrous material with a diameter of 25 μm, a pore size of 22 to 30 μm, and a porosity of 75%. In other words, Sounai discloses that neither the first and second layer has a porosity greater than 80% or a porosity that is "close" to greater

than 80%, as recited in claim 1. In fact, Sounai discloses that the first and second porous layers have the same porosity. As a result, Example 1 of Sounai cannot be relied upon to disclose or suggest the features of claim 1.

Applicant notes that Example 2 of Sounai regards a combination of a fibrous metal and a powdery metal, not two layers of fibrous metal. See Sounai at col. 7, lines 13-28. Therefore, Example 2 of Sounai is not applicable to the stack of claim 1 because Example 2 does not provide first and second metal layers.

In addition, Sounai does not disclose or suggest layers being sintered to one another, as recited in claim 1, as suggested on page 3 of the Office Action. To address this deficiency, the Office cites Cisar. Cisar discloses a barrier and flow control device for electrochemical reactors that includes a flow field 102, a thin porous gas diffusion layer 104 sintered to the flow field 102, a membrane 106, and electrodes 108, 109. See col. 9, lines 1-13, 37-47, and Figures 13 and 15 of Cisar. Cisar discloses that flow field can have a structure of metal foam, metal grids, sintered metal particles, sintered metal fibers, and combinations thereof. See claim 2 of Cisar.

However, Cisar does not remedy the deficiencies of Sounai discussed above because Cisar also does not disclose or suggest a stack comprising, among other things, an impermeable metal structure, at least one first metal fiber layer, and at least one second metal fiber layer, said first metal fiber layer having fibers with an equivalent diameter larger than 20 μm, said second metal fiber layer having fibers with an equivalent diameter smaller than 10 μm, wherein a porosity of said second metal fiber layer is less than 80%, and wherein a porosity of said first metal fiber layer is more than 80%, as recited in claim 1.

Further, as suggested on pages 3-4 of the Office Action, the combination of Sounai and Cisar does not disclose or suggest the planar air permeability of claim 1. The Office argues on pages 3-4 of the Office Action that the stack of Sounai and Cisar would have the planar air permeability of claim 1 because the porous layers of Sounai would have the porosities recited in claim 1. The Office cites examples 1 and 2 of Sounai and, more particularly, the Office states on page 4 of the Office Action that air permeability is a function

of porosity, pore size, and distribution of porosity, that the porous layers of Sounai would have a generally even distribution of porosity, and that the porous layers of Sounai would inherently have the planar air permeability of claim 1. Applicant respectfully disagrees.

For a fibrous layer, air permeability can be determined by means of the porosity of the fibrous layer and the equivalent diameter of fibers in the layer. Enclosed with this response is a graph of maximum pore size versus density and porosity for various layers, with the solid lines showing the results of experimental data and the dashed lines corresponding to a mathematical formula, which will be discussed below. The horizontal axis corresponds to the porosity and density of the layers, while the vertical axis corresponds to the maximum pore size of the layers, in μm.

The maximum pore size (Dm) of the layers can be expressed by the following formula:

$$Dm\ (\mu m) = D / (1 - \text{porosity}),$$

where D is diameter of the fibers.

When applying this formula to Example 1 of Sounai, which provides a porosity of 75% for the first and second porous layers, a diameter of 4 μm for the first porous layer, and a diameter of 25 μm for the second porous layer, the following results are obtained for the first and second layers:

$$Dm\ (\text{first porous layer}) = 4 / (1 - 0.75) = 16\ \mu m$$

$$Dm\ (\text{second porous layer}) = 25 / (1 - 0.75) = 100\ \mu m$$

These maximum pore sizes are significantly larger than the pore sizes disclosed by Sounai for the first and second porous layers of Example 1, which are 2-5 μm and 22-30 μm, respectively. This demonstrates that the first and second porous layers of Sounai would not inherently posses the planar air permeability recited in claim 1 because Sounai discloses pore sizes for the first and second porous layers of Sounai that are significantly smaller than the maximum pore sizes that correspond to the planar air permeability of claim 1.

For at least the reasons discussed above, the combination of Sounai and Cisar does not disclose or suggest all of the features of claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

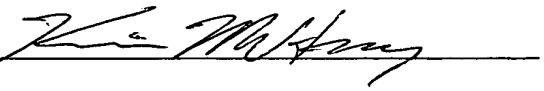
Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date April 2, 2010 By 

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